LISTING OF CLAIMS

Claims 1-16   (canceled).

17.   (Withdrawn - currently amended)   The method according to claim 37, wherein the physical feature is calculated by curve fitting the-measured differential backscatter signal to a backscatter function, in which the backscatter function is a function of an average path-length (τ) traveled by detected scattered photons, the average path-length (τ) being independent from an absorption coefficient (μ_a) of the medium, and from a scattering coefficient (μ_s) of the medium.

18.   (Withdrawn)   The method according to claim 17, wherein the average path-length (τ) is also independent from a wavelength (λ) of the first and second backscattered radiation.

19.   (Withdrawn)   The method according to claim 17, wherein the path-length (τ) is proportional to the first fiber diameter.

20.   (Withdrawn)   The method according to claim 17, wherein the backscatter function is given by:

$$R_{bs}=C_1 \cdot \mu_s \cdot \exp(-\tau \cdot \mu_a)$$

with $\tau=C_2 \cdot d_{fiber}$ where C_1 and C_2 are constants, μ_a is the absorption coefficient of the medium, μ_s is the scattering coefficient of the medium, and d_{fiber} is the first fiber diameter.

21.   (Withdrawn)   The method according to claim 20, wherein C_2 is approximately 0.6.

22.   (Withdrawn)   The method according to claim 17, wherein the physical feature is a concentration of at least one substance in the medium.

23.   (Withdrawn – currently amended)   A device for determining a physical feature of a medium, comprising:

a light source (2) for producing radiation;

a probe with at least a first and a second optical fiber (5, 6), the first optical fiber (5) having a first diameter and being arranged to deliver the radiation on a sample (1) of the medium and to collect first backscattered radiation from the sample (1), the second optical fiber (6) having a second diameter and being arranged to collect second backscattered radiation, wherein the second optical fiber (6) is positioned

alongside the first optical fiber (5);

a spectrometer (7) for producing a first signal (1) based on the first backscattered radiation, and for producing a second signal (J) based on the second backscattered radiation; and

a processor (9) arranged to determine a measured differential backscatter signal as a function of wavelength (λ) using the first and second signals (I, J), wherein the processor is arranged to calculate the physical feature ~~by curve fitting the measured differential backscatter signal to a backscatter function (R_{bs}), in which the backscatter function is a function of an average path-length (τ) traveled by detected scattered photons, the average path-length (τ) being independent from an absorption coefficient (μ_a) of the medium, and from a scattering coefficient (μ_s) of the medium~~.

24.   (Withdrawn – currently amended)   Computer program product to be loaded by a computer, the computer program product, after being loaded, providing the computer with the capacity to:

receive a first signal (1) indicative of a collected radiation received from a first fiber (5) and a second signal (J) indicative of a collected radiation received from a second fiber (6);

determine a measured differential backscatter signal (R_{bs}) as a function

of wavelength (λ) of the collected radiation using the first and second signals (I, J); and

calculate a physical feature ~~by curve fitting the measured differential~~

~~backscatter signal to a backscatter function, in which the backscatter function is a~~

~~function of an average path-length (τ) traveled by detected scattered photons, the~~

~~average path-length (τ) being independent from an absorption coefficient (μ_a) of the~~

~~medium, and from a scattering coefficient (μ_s) of the medium.~~

25.   (Withdrawn)   Data carrier provided with a computer program product

according to claim 24.

26.   (Currently amended)   A method according to claim 37, wherein

<u>the physical feature is calculated by curve fitting the measured differential backscatter</u>

<u>signal to a backscatter function, in which</u> the backscatter function is a function of a

mean free path of photons.

27.   (Previously presented) The method according to claim 26, wherein the

backscatter function (R_{bs}) is defined by:

$$R_{bs}(\lambda) = C_{app}' \cdot p(\lambda,180) \cdot \mu_s(\lambda) \cdot \exp(-2 \cdot mfp(\lambda)) \cdot \sum_{i=1}^{n} \rho_i \cdot \mu_a^{spec,i}(\lambda))$$

where C_{app}' is an apparatus constant, p(λ,180) is a phase function, $\mu_s(\lambda)$ is a scattering

coefficient of the medium, λ is a wavelength of the first and second backscattered

5

radiation, mfp(λ) is the mean free path as a function of the wavelength, n is a number

of substances in the medium, ρ_i is concentration of absorber i present in a detection

volume of the sample (1), and $\mu_a^{spec,i}(\lambda)$ is an absorption coefficient of substance i as a

function of the wavelength.

28.   (Canceled)

29.   (Currently amended)   A device for determining a physical feature of a

medium, comprising:

a light source (2) for producing radiation;

a probe with at least a first and a second optical fiber (5, 6), the first

optical fiber (5) having a first diameter and being arranged to deliver the radiation on

a sample (1) of the medium and to collect first backscattered radiation from the sample

(1), the second optical fiber (6) having a second diameter and being arranged to collect

second backscattered radiation, wherein the second optical fiber (6) is positioned

alongside the first optical fiber (5);

a spectrometer (7) for producing a first signal (1) based on the first

backscattered radiation, and for producing a second signal (J) based on the second

backscattered radiation;

a processor (9) arranged to determine a measured differential backscatter signal as a function of wavelength (λ) using the first and second signals (I, J), wherein the processor is arranged to calculate the physical feature ~~by curve fitting the measured differential backscatter signal to a backscatter function (R_{bs}), wherein the backscatter function is a function of a mean free path of photons~~.

30.   (Previously presented) Computer program product to be loaded by a computer, the computer program product, after being loaded, providing the computer with the capacity to:

receive a first signal (1) indicative for a collected radiation received from a first fiber (5) and a second signal (J) indicative for a collected radiation received from a second fiber (6);

determine a measured differential backscatter signal (R_{bs}) as a function of wavelength (λ) of the collected radiation using the first and second signals (I, J); and

calculate a physical feature by curve fitting the measured differential backscatter signal to a backscatter function, wherein the backscatter function is a function of a mean free path of photons.

31.   (Previously presented) A computer which has been loaded with a

computer program product according to claim 30.

32.   (Withdrawn)   The method according to claim 17, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

33.   (Currently amended)   The ~~method~~ <u>device</u> according to claim 23, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

34.   (Previously presented)The method according to claim 26, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations

of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

35.   (Currently Amended) The ~~method~~ <u>device</u> according to claim 29, wherein the method further comprises the steps of:

simultaneously measuring backscatter radiation on different locations of the sample (1);

determining a physical feature for the different locations; and

calculating a standard deviation of the physical feature.

36.   (Previously presented)   The device according to claim 29, wherein the physical feature is a concentration of at least one substance in the medium.

37. (Currently amended) A method of determining a physical feature of a medium, comprising the steps of:

producing radiation with a light source (2);

placing a probe on a sample (1) of the medium, the probe comprising a first optical fiber (5) having a first diameter, and at least a second optical fiber (6) having a second diameter;

sending light coming from the light source, through the first optical

fiber;

collecting first backscattered radiation through the first optical fiber and second backscattered radiation through the second optical fiber;

producing a first signal (1) based on the first backscattered radiation, and a second signal (J) based on the second backscattered radiation;

determining a measured differential backscatter signal as a function of wavelength using the first and second signals (I, J); and

calculating the physical feature ~~by curve fitting the measured differential backscatter signal to a backscatter function, in which the backscatter function is a function of a mean free path of photons~~.

38. (Previously presented) A method according to claim 37, wherein the fibers are positioned alongside one another.

39. (New) <u>The device according to claim 23, wherein the processor is arranged to calculate the physical feature by curve fitting the measured differential backscatter signal to a backscatter function (R$_{bs}$), in which the backscatter function is a function of an average path-length (τ) traveled by detected scattered photons, the average path-length (τ) being independent from an absorption coefficient (μ_a) of the medium, and from a scattering coefficient (μ_s) of the medium.</u>

40. (New) <u>The device according to claim 29, wherein the processor is</u>

arranged to calculate the physical feature by curve fitting the measured differential backscatter signal to a backscatter function (R_{bs}), wherein the backscatter function is a function of a mean free path of photons.

41. (New) Computer program product as defined in claim 24, wherein the physical feature is calculated by curve fitting the measured differential backscatter signal to a backscatter function, in which the backscatter function is a function of an average path-length (τ) traveled by detected scattered photons, the average path-length (τ) being independent from an absorption coefficient (μ_a) of the medium, and from a scattering coefficient (μ_s) of the medium